

AMENDMENTS TO THE SPECIFICATION:

Please amend the heading on page 1, line 3, as follows:

~~Technical field~~Technical Overview

Please amend the paragraph on page 1, line 4, as follows:

The present invention relates in general to the field of is wireless communications, and in particular to . The technology is a communication device and a method that are capable of for downloading and upgrading terminal software of the device over-the-air in a efficient and fail-safe manner. Furthermore, the present invention relates to a A system in a wireless network including includes such a communication device and a computer computer-readable medium comprising instructions for executing the method according to the present invention.

Please amend the heading on page 1, line 12, as follows:

~~Background of the invention~~

Please amend the heading on page 2, line 32, as follows:

~~Brief description of the invention~~Summary

Please amend the paragraph on page 2, line 33, as follows:

An object of the present invention is to provide a communication device and a method that are capable of downloading and upgrading terminal software of the device over-the-air in a efficient and fail-safe manner. This and other objects are achieved according to the present

~~invention~~ by a communication device and method having the features defined in the independent claims. Preferred embodiments are defined in the dependent claims.

Please amend the paragraph on page 3, line 5, as follows:

~~In the context of the present invention, the~~ The term communication device refers to a software programmable wireless communication terminal. A communication device may receive, transmit, or both using either simplex or duplex communication techniques. A communication device can be, for example, a cellular phone, a computer with a modem, a pager, or personal digital assistant. Furthermore, the term wireless network should be interpreted broadly as a communication principle more than an actual network.

Please amend the paragraph on page 3, line 14, as follows:

~~According to a first aspect of the invention,~~ there is provided a method for providing a communication device with radio software from a server via a wireless network including a number of access networks, the communication device being arranged to operate in the wireless network and comprising a transceiver for receiving the radio software and storing means comprising at least two radio access technologies for communication with corresponding access networks of the wireless network, comprising the steps of: initiating a download of radio software of a first radio access technology of the communication device; selecting a radio access technology of the communication device for downloading the software; downloading the radio software via the available radio access technology, wherein the radio software designed for the first radio access technology is stored in a memory ~~space of the storing means.~~

Please amend the paragraph on page 3, line 28, as follows:

According to a second aspect ~~of the invention~~, there is provided a communication device arranged to operate in a wireless network including a number of access networks, comprising a transceiver for receiving radio software from a software download server via the wireless network; ~~storing means comprising~~ at least two radio access technologies for communication with corresponding radio access networks of the wireless network; ~~comprising controlling means~~ a controller for controlling the operation of the transceiver and ~~the storing means~~ a memory and arranged to select a radio access technology for downloading of radio software for a first radio access technology of the communication device; ~~and wherein the~~ The radio software of the first radio access technology is downloaded via the selected radio access technology and stored in ~~a the memory-space of the storing means~~.

Please amend the paragraph on page 4, line 8, as follows:

According to a third aspect ~~of the present invention~~ there is provided a system in a wireless network including a number of access networks, comprising a software download server connected to the wireless network and at least one communication device according to the ~~second aspect of the invention~~.

Please amend the paragraph on page 4, line 13, as follows:

According to a further aspect ~~of the invention~~ there is provided a computer readable medium comprising instructions for bringing a programmable device to perform the method according to the first aspect ~~of the invention~~.

Please amend the paragraph on page 4, line 16, as follows:

The ~~present invention~~ technology described in this application is based on the idea of utilizing the in-built functionality of a communication device, i.e. the multiple radio access technology, at the downloading or upgrading of software of one radio access technology of the device. ~~In other words, the basic principle of the present invention is to download or upgrade software~~ Software intended for one radio access technology downloaded or upgrade is over an available radio access technology supported by the device.

Please delete the paragraph on page 5, line 1 through line 4.

Please amend the paragraph on page 5, line 6, as follows:

Fig. 1 schematically shows ~~the a principle of the present invention~~ technology described in this application;

Please amend the paragraph on page 5, line 7, as follows:

Fig. 2 is a flow chart of the downloading procedure according to a first non-limiting ~~example embodiment of the present invention;~~

Please amend the paragraph on page 5, line 9, as follows:

Fig. 3 is a flow chart of the downloading procedure according to a second non-limiting ~~example embodiment of the present invention;~~

Please amend the paragraph on page 5, line 11, as follows:

Fig. 4a is a flow chart of steps of the verification procedure in the communication device according to one non-limiting, example embodiment of the presentation;

Please amend the paragraph on page 5, line 14, as follows:

Fig. 4b is a flow chart of steps of the verification procedure in the communication device according to the embodiment of the present invention shown in Fig. 4a;

Please amend the paragraph on page 5, line 17, as follows:

Fig. 5a is a flow chart of steps the triggering procedure in the server according to a first non-limiting, example embodiment of the present invention;

Please amend the paragraph on page 5, line 19, as follows:

Fig. 5b is a flow chart of steps the triggering procedure in the communication device according to a the first embodiment of the present invention;

Please amend the paragraph on page 5, line 22, as follows:

Figs. 6a-6b is a flow chart of the triggering procedure according to a second non-limiting, example embodiment of the present invention; and

Please amend the paragraph on page 5, line 24, as follows:

Figs. 7a-7b is a flow chart of the triggering procedure according to a third non-limiting, example embodiment of the present invention.

Please amend the heading on page 5, line 27, as follows:

Description of ~~preferred~~ non-limiting, example embodiments

Please amend the paragraph on page 5, line 28, as follows:

The ~~present invention technology described in this application~~ provides a method and a communication device adapted for operation in a wireless network. The network primarily includes at least one communication device, at least one base station, and a server. For the sake of simplicity, the at least one base station will not be discussed in the forthcoming description since its functioning and interaction with other parts of the network is well known for the man skilled in the art. It should however be noted that the wireless network, in turn, can comprise a number of wireless sub-networks, for example, access networks such as WLAN.

Please amend the paragraph on page 6, line 4, as follows:

With reference first to Fig. 1, ~~the main a principle of the present invention technology described in this application~~ will be described. Fig. 1 shows a simplified block diagram of a wireless network ~~in which the present invention may be provided~~. According to one embodiment ~~of the present invention~~, the wireless network 19 includes a software download server 1, for example, located at a service centre is connected to a backbone network 3, which, in turn, is connected to different wireless access networks 5 and 7. Such access networks can, for example, be access networks for WCDMA, GSM/GPRS, WLAN, or Bluetooth. A communication device 9 comprising a transceiver 11 for receiving, for example, software transferred from the server 1, a memory 13, initiating means 16 arranged to initiate or trigger a

software download, and a controller 18 for controlling, for example, the download process of the software in the communication device 9. The controller 18 is, inter alia, arranged to select a radio access technology for downloading of the radio software. According to a preferred embodiment of the present invention, a first radio access technology 15, for example, WLAN, and a second radio access technology 17, for example, WCDMA are implemented in the memory and in software configured hardware 13. Of course, there are other conceivable embodiments, for example, three radio access technologies can be implemented in the memory 13. The controller 18 is connected to the transceiver 11, the memory 13, and means for initiating a downloading process 16.

Please amend the paragraph on page 6, line 26, as follows:

~~The main principle of the downloading process is the following.~~ A download of software, for example, configuration information of a RAT of the communication device 9 can be initiated or triggered by a request from the communication device 9, the server 1, or an access network 5 or 7, which starts the download process as will be described further below with reference to Figs. 5-7. In the example shown in fig. 1, software for the first RAT 15 is the subject for the download. Thereafter, when it is verified that the software version of the first RAT 15 is not up to date with the corresponding software included in the software download server 1, a RAT of the communication device available for downloading is identified. This verification procedure will also be described with reference to Figs. 5-7 and as it will be explained it may differ depending on how the download procedure was triggered. In order to find an available RAT, a checking or selecting process is performed, which will be described below with reference to figs. 2 and 3. It should be noted however that the second RAT is not

implemented with a sole purpose of serving a download interface, but as a communication interface. Accordingly, the first RAT 15 could be a technology that includes software designed for WLAN that may be used for communication in local hotspots area, while the second RAT 17 can be a technology that includes software designed for WCDMA with continuous coverage. In this case, the second RAT 17 is found to be available for download in the above-mentioned procedure. Subsequently, the software is downloaded wirelessly via the access network 5 for the second RAT 17. During the downloading of the software, the software is stored in the memory 13, which will be described in more detail with reference to figs. 2 and 3.

Please amend the paragraph on page 7, line 18, as follows:

Turning now to fig. 2, the downloading procedure according to a first embodiment of the present invention will be described. Initially, at step 20, the means for initiating 16 a downloading process of the communication device 9 is in an idle state. However, other means of the device may be in operation, for example, the first RAT 15 can be in a communication state via the access network for the first RAT 15. At step 21, a download of software of a new version of software from the server 1 for the first RAT 15 is triggered. A downloading process may be triggered in a number of different ways, which will be described with reference to figs. 5-7, for example by means of the initiating means 16. Thereafter, at step 22, a check whether the second RAT 17 of the communication device 9 is available for download is performed, i.e. whether the RAT 17 is occupied by; for example, a communication process. If the communication device 9 comprises three or more RATs, all of these are of course included in the above-mentioned checking process. If the second RAT 17 is identified as available, the download 18 is, at step 23, performed via the backbone network 3, the access network 5 of the second RAT, and the second

RAT 17 and during the download the software is stored in a memory space allocated for the first RAT 15. Preferably, the old version of the first RAT 1 currently stored in the memory 13 is over-written during the downloading process. Thereby, memory space can be saved. On the other hand, if the second RAT 17 is found to be occupied by another process thereby making a download of software via RAT 17 very slow or even impossible, a check whether the first RAT 15 is in use is performed at step 24. If the first RAT 15 is identified to be in use, the downloading process is, at step 25, inhibited.

Please amend the paragraph on page 8, line 27, as follows:

With reference now to fig. 3, the downloading procedure according to a second embodiment of the present invention will be described. Initially, at step 30, the means for initiating a downloading process of the communication device 9 is in an idle state. However, other means of the device may be in operation, for example, the first RAT 15 can be in a communication state via the access network for the first RAT 7. At step 31 a download of software from the server 1 for the first RAT 15 is triggered. A downloading process may be triggered in a number of different ways, which will be described with reference to figs. 5-7. Thereafter, at step 32, a check whether the second RAT 17 of the communication device 9 is available for download is performed, i.e. whether the RAT 17 is occupied by, for example, a communication process. If the communication device comprises three or more RATs, all of these are of course included in the above-mentioned checking process. If the second RAT 17 is identified as available, the download 18 is, at step 33, performed via the backbone network 3, the access network of the second RAT 5, and the second RAT 17 and during the download the software is stored in a memory space allocated for the first RAT 15. Preferably, the old version

of the first RAT 15 currently stored in the memory 13 is over-written during the downloading process. Thereby, memory space can be saved.

Please amend the paragraph on page 10, line 22, as follows:

At step 42, an error handling procedure is performed if any one of these tests fail. In accordance with embodiments of the present invention, this error handling procedure comprises the downloading procedure described with reference to Fig. 2 or 3.

Please amend the paragraph on page 11, line 22, as follows:

With reference now to Figs. 5a and 5b, the initiating or triggering procedure according to a first embodiment of the invention will be described. In this embodiment the downloading is initiated by the server. First, at step 60, the server is in an idle state. Then, at step 61, the server receives a new version of software for the first RAT 15, which can be a WLAN that may be used for communication in local hotspots area. As an example, the operator of the network at which the communication device 9 is connected to implements the new or updated version of the software for the first RAT 15 in the server 1. Thereafter, at step 62, the server 1 sends a polling message to the client, i.e. the communication device 9, which may be in an idle state, see step 63. The message is sent over the access network and RAT with which the communication device is currently associated. Upon receipt of the polling message, at step 64, the client, at step 65, responds with an indication message including information of the current software version of the first RAT. Thereafter, at step 70, the communication device 9 returns to idle state. Then, at step 66, the server 1 receives the indication message from the communication device 9. Subsequently, at step 67, a check is performed whether the software of the first RAT is up to date

with the latest or newest version of corresponding software of the server. However, there may be several versions of the software available in the server 1, each comprising different features and in this case a selection can be done in order to choose one of the versions. If no, at step 68, a download procedure according to the description above is started or initiated. Then, at step 69, the server returns to the idle state. On the other hand, if the software version of the first RAT is found to be up to date the server returns to the idle state at step 69.

Please amend the paragraph on page 12, line 15, as follows:

Referring now to Figs. 6a and 6b, the initiating or triggering procedure according to a second embodiment of the invention will be described. Initially, at step 80, the client, i.e. in this case the communication device 9, is in an idle state. Then, at step 81, the triggering procedure is initiated by the user, which may be due to a need or desire for a new or updated version of the software of a specific RAT of the communication device 9, or by an internal instruction of the device itself by requesting the communication device 9 to update the software of a specific RAT included in the communication device 9 utilizing the initiating means 16 of the communication means 9. Subsequently, at step 82, the communication device 9 sends a software inquiry message indicating the current software version of the specified RAT to the server 1 via an arbitrary RAT of the communication device 9 and backbone network 3. After that, at step 83, the communication returns to an idle state. Initially, at step 84, the server 1 is in an idle state, and at receipt of the software inquiry message, at step 85, the server 1 is set in active state. Then, at step 86, a check is performed whether the software of the specific RAT is up to date with the latest or newest version of corresponding software of the server. However, there may be several versions of the software available in the server 1, each comprising different features and in this

case a selection can be done in order to choose one of the versions. If no, at step 87, a download procedure according to the description above is initiated. Then, at step 88, the server returns to the idle state. On the other hand, at step 88, if the software version of the first RAT is found to be up to date the server returns directly to the idle state.

Please amend the paragraph on page 13, line 7, as follows:

With reference now to Figs. 7a and 7b, the initiating or triggering procedure according to a third embodiment of the invention will be described. In this embodiment, the client, i.e. in this case the communication device 9, will be in an idle state during the triggering procedure. The procedure is initiated by a software check of a RAT of the communication device 9, which check in this case is a part of the normal association procedure between the client and the access network of the RAT. For example, if the communication device connects to a WLAN the software of the corresponding RAT of the communication device 9 is checked. Initially, at step 90, a specific access network is in an idle state. Then, at step 91, as part of the association procedure the access network performs a check of the software of the corresponding RAT of the communication device, i.e. retrieve information regarding the current software version.

Thereafter, at step 92, the access network sends a software inquiry message to the server 1 via the backbone network 3, and, at step 94, returns to the idle state. Initially, at step 94, the server 1 is in an idle state, and at receipt of the software inquiry message, at step 95, the server 1 is set in active state. Then, at step 96, a check is performed whether the software of the specific RAT is up to date with the latest or newest version of corresponding software of the server. However, there may be several versions of the software available in the server 1, each comprising different features and in this case a selection can be done in order to choose one of the versions. If no, at

step 97, a download procedure according to the description above is initiated. Then, at step 98, the server returns to the idle state. On the other hand, at step 98, if the software version of the first RAT is found to be up to date the server returns directly to the idle state.

Please amend the paragraph on page 14, line 1 as follows:

Although specific embodiments have been shown and described herein for purposes of illustration and ~~exemplification~~example, it is understood by those of ordinary skill in the art that the specific embodiments shown and described may be substituted for a wide variety of alternative and/or equivalent implementations without departing from the scope of the ~~invention~~claims. Those of ordinary skill in the art will readily appreciate that the ~~present invention~~technology described in this application could be implemented in a wide variety of embodiments, including hardware and software implementations, or combinations thereof. As an example, many of the functions described above may be obtained and carried out by suitable software comprised in a micro-chip ~~or the like data carrier~~. This application is intended to cover any adaptations or variations of the preferred embodiments discussed herein. Consequently, the present invention is defined by the wording of the appended claims and equivalents thereof and the invention is not to be regarded as limited to ~~only~~ the structural or functional element described in the embodiments, but to the attached claims.